

REMARKS

Accompanying this response, please find marked-up paragraphs of the specification which overcome some informalities noted in the specification. The undersigned avers that the enclosed replacement paragraph(s) of the specification do not contain any new matter.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



Anthony G. M. Davis, Reg. No. 27,868
Customer No. 020210
Davis & Bujold, P.L.L.C.
Fourth Floor
500 North Commercial Street
Manchester NH 03101-1151
Telephone 603-624-9220
Facsimile 603-624-9229
E-mail: patent@davisandbujold.com

- [001] ELECTRODYNAMIC DRIVE SYSTEM
- [002] **FIELD OF THE INVENTION**
- [003] —The invention concerns an electrodynamic drive train system for a vehicle in accord with the concept of Claim 1.
- [004] **BACKGROUND OF THE INVENTION**
- [005] Drive systems for vehicles customarily comprise an internal combustion motor as the driving machine, a subsequent manual transmission and a friction clutch placed between the internal combustion motor and the transmission or again, comprise a hydrodynamic converter placed between the internal combustion motor and the transmission. The friction clutch or the converter are burdened with losses and present energy losses in the drive train.
- [006] The invention has the purpose of minimizing the losses which occur between the driving machine and the manual transmission.
- [007] This purpose is achieved by a drive system with the features of Claim 1. Embodiments of the invention are the objects of subordinate claims.
- [008] **SUMMARY OF THE INVENTION**
- [009] In accord with the invention, and with an electrodynamic drive system for a vehicle, it is proposed to place a planetary gear drive between a driving machine and a manual transmission, which said planetary gear drive encompasses the three elements, sun gear, internal gear, and planetary carrier. Of these three elements, a first element is connected to the manual transmission, a second element is bound to the driving machine, and a third element is coupled with at least one electric motor. An advantageous construction possesses a control, which can regulate the at least one electric motor in the 4-quadrant operation. A further embodiment possesses a clutch between two elements of the planetary drive for the lockup or bypass of the planetary drive, which in one type of assembly includes a dog clutch. In an additional arrangement, an overtake-free wheeling device is placed between the driving machine and the electrodynamic drive system. In yet another embodiment, several electric motors in combination act upon one of the elements of the planetary drive. In an advantageous embodiment, a lock-up torque

- at least one electric motor, which can operate both as a drive motor as well as a generator,
- if required, a shifting clutch for bypassing the electric motor, when it need not be required as a motor,
- as well as the output shaft to the manual transmission and
- in some cases, a retarder.

[012] In comparison to conventional drive systems, the following can be eliminated:

- a dry clutch with disengagement means,
- a starter,
- a generator (light machine),
- in some cases, mechanical auxiliary power take-offs,
- partially, one or more mechanical gear stages, because the electrodynamic drive system introduces a corresponding increase of torque.\

[013] **BRIEF DESCRIPTION OF THE DRAWINGS**

[014] The invention, in the following, is explained in greater detail with the aid of the drawing. There is shown in: **will now be described, by way of example, with reference to the accompanying drawings in which:**

- [015] Fig. 1 is a sketch of the principles of the invention;
- [016] Fig. 2 is an embodiment in accord with Fig. 1 with brake retard system;
- [017] Fig. 3 is an embodiment in accord with Fig. 1 with overrunning clutch;
- [018] Fig. 4 is an embodiment in accord with Fig. 3 with a retarding brake system; and
- [019] Fig. 5 is an embodiment in accord with Fig. 4 with additional overrunning clutch.

[020] **DETAILED DESCRIPTION OF THE INVENTION**

[021] Fig. 1 presents a sketch of the principles of the invented drive system 2. At the output of a drive machine 4, a flywheel 6 is installed, which, by means of a